WE CLAIM:

1. A method for enabling system layout and testing (SLAT) and configuration management of nodes in a consolidated network element (CNE) comprising steps of:

inserting into an overhead part of at least one data frame in each data stream sent from a first to a second interconnected node in the CNE, an identifier of equipment that controls the insertion, a transmit port that transmitted the data frame, a strand through which the data frame was sent and, an equipment type of the identified equipment;

transmitting each of the data frames from respective transmit ports, through respective strands, to respective receive ports of the second node;

receiving the data frames at the respective receive ports; and

extracting the overhead parts and processing the overhead parts to assemble messages useful for SLAT and configuration management.

2. A method as claimed in claim 1 further comprising a step of using the equipment type for automatically setting at least one port parameter setting of the receive port at which the message was received.

3. A method as claimed in claim 1 further comprising a step of using the respective strand identifiers to

verify an integrity of a strand over which the data frames were transmitted.

4. A method as claimed in claim 3 further comprising a step of verifying a sequence of the strands in a strand bundle interconnecting the first and second nodes.

5. A method as claimed in claim 4 further comprising a step of performing contiguity verification for strands in the strand bundle, and the messages transmitted over last strands in a group of strands that form a consolidated channel further comprise final strand tags.

6. A method as claimed in claim 5 further comprising a step of reporting to a management interface a detected broken strand, a failed verification of a strand bundle sequence, and failed contiguity verification for strands in the strand bundle.

7. A method as claimed in claim 1 wherein the step of extracting and processing the overhead parts to assemble respective messages comprises a step of using respective port and equipment identifiers received at a plurality of respective receive ports to perform at least one of: verification of adherence to equipping rules; contiguity verification of strands in strand bundles; and generation of a connectivity map of at least some of the collocated nodes.

8. A method as claimed in claim 7 further comprising a step of reporting to a management interface at least one of:

a detected conflict with programmed equipping rules that are associated with an equipment type of the identified equipment;

a breach of contiguity bundles of optical fiber that are assigned to be grouped; and

the generated connectivity map.

9. A method as claimed in claim 1 wherein the nodes are adapted to perform bidirectional transport of data streams, and the method further comprises steps of:

extracting at least equipment and port identifiers from a message received at a receive port of a node;

inserting the respective equipment and port identifiers into a reply to the message; and

transmitting the reply using a communications channel in the overhead part of a data frame sent from a transmit port of the node, the transmit port being a port paired with the receive port from which the message was received;

whereby a correlation of the reply received at a port with identifiers assigned to the port and sent in the message enables the node that receives the reply to verify that an inter-node link forms a bidirectional link that conforms with the intended pairing of ports in the CNE.

10. A method as claimed in claim 9 further comprising a step of reporting to a management interface any detected mismatch between the intended pairing of ports in the interconnected nodes and the bidirectional links discovered between the interconnected nodes.

11. A method as claimed in claim 9 wherein the data frames comprise frames of one of a synchronous optical network (SONET) and a synchronous digital hierarchy (SDH) protocol, and the step of inserting into overhead parts comprises a step of inserting respective bits of the message into a section trace formed of consecutive J0 bytes in a section/regenerator overhead portion of the frames.

12. A message for enabling inter-node connection discovery between interconnected nodes of a consolidated network element (CNE) that convey data frames with overhead and payload parts, the nodes being interconnected by bundles of optical fiber strands, the message being conveyed from a sending node, through a strand, to a receiving node, the message comprising:

an equipment identifier assigned to equipment of the sending node that controls generation of the message;

a port identifier that identifies a transmit port of the sending node that transmits the message;

a strand identifier, identifying a strand over which the message is transmitted; and

an equipment type identifier that identifies a category of the control equipment.

13. A message as claimed in claim 11 wherein the message is carried in a overhead part of at least one data frame.

14. A message as claimed in claim 13 wherein the data frames comprise frames of one of a synchronous optical network (SONET) and a synchronous digital hierarchy (SDH) protocol, and the message is sent one byte per frame in consecutive J0 bytes of the frames.

15. A message as claimed in claim 13 wherein the equipment identifier identifies one of a shelf controller for the transmit port and the sending node.

16. A message as claimed in claim 15 wherein the equipment identifier comprises a media access control (MAC) address.

17. A message as claimed in claim 15 wherein the equipment type identifier enables a retrieval of sufficient information respecting a sender of the message to ensure that the receiving node can determine port settings to apply to the receive port at which the message was received.

18. A message as claimed in claim 17 wherein the information defines a protection scheme, and connection management requirements for the receive port.

19. A message as claimed in claim 15 further comprising a final strand tag field used to facilitate contiguity and sequence testing of groups of strands that form a consolidated channel.

20. A method for automatically provisioning a receive port of a second node adapted to receive data frames with overhead and payload parts from a transmit port of a first node, the first and second nodes being interconnected in a consolidated network element (CNE), the method comprising steps of:

formulating and inserting a message of a predefined format into at least one predetermined byte of the overhead part of at least one data frame, the message containing information respecting the first node;

transmitting the at least one data unit to a receive port of the second node;

extracting the message from the at least one data frame at the receive port; and

using the information in the message to automatically set at least one port configuration parameter of the receive port.

21. A method as claimed in claim 19 wherein the step of using the information comprises a step of provisioning the receive port to conform to connection management requirements.